

MICROWAVE ANTENNAS
KS-15837, KS-15838, AND KS-15924
PARABOLIC ANTENNAS
ASSEMBLY AND INSTALLATION

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REFLECTOR POSITION ON MOUNTING FRAME	4	1.01 This section covers the KS-15837 (8 ft. diameter), the KS-15838 (10 ft. diameter) rated Manufacture Discontinued, and the KS-15924 (10 ft. diameter) Antennas. The KS-15924 Antenna is shown in Fig. 1 and is typical in appearance to the other antennas. Each consists of a spun-aluminum dish reflector, a broadband center-mounted antenna feed using a fixed or rotatable mounting, and a triangular shaped tubular steel mounting frame which permits independent azimuth and elevation adjustments. The antenna feed is bolted to the center of the reflector and supported by three guy wires from the reflector rim. Both the reflector and the feed may be supplied with or without heaters. The antenna feed is designed for use with 2.290 by 1.145-inch waveguide in a pressurized waveguide system.	
ANTENNA FEED ASSEMBLY	9	1.02 Due to the similarity of the KS-15837, KS-15838 and KS-15924 Antennas, this section is written as a common section. Except where noted, the information contained herein is applicable to all three antennas.	
FEED GUYING ASSEMBLY	11	1.03 The antennas are intended for use in the TD-2 Microwave Radio Relay System to transmit and receive microwave signals in the frequency range of 3.7 to 4.2 GHz.	
FEED HEATER ASSEMBLY AND WIRING	13	1.04 The KS-15837 antenna is covered by the following specification and list numbers. The lists covering separate heaters are included to provide an ordering code when these items are needed for maintenance and repair.	
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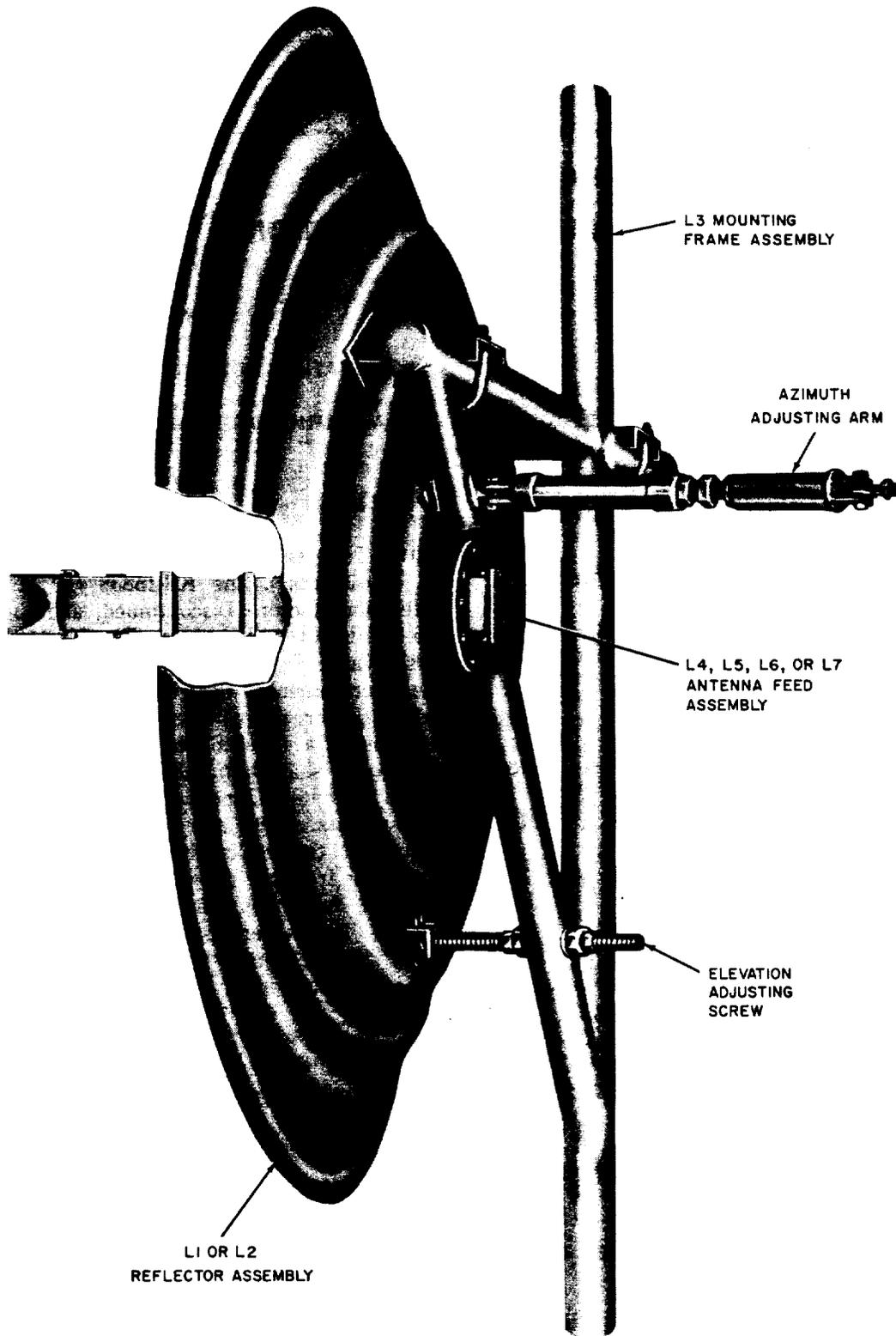


Fig. 1—Overall View of KS-15924 Antenna

KS-15837 L1	Reflector Assembly (without feed and heater)	KS-15924 L2	Reflector Assembly and 2250-watt Heater (without feed)
KS-15837 L2	Reflector Assembly and 1500-watt Heater (without feed)	KS-15924 L3	Mounting Frame Assembly
KS-15837 L3	Mounting Frame Assembly	KS-15924 L4	Broadband Antenna Feed Assembly (fixed mounting—without heater)
KS-15837 L6	Broadband Antenna Feed Assembly (fixed mounting—without heater)	KS-15924 L5	Broadband Antenna Feed Assembly (360-degree rotatable mounting—without heater)
KS-15837 L7	Broadband Antenna Feed Assembly (360-degree rotatable mounting—without heater)	KS-15924 L6	Broadband Antenna Feed Assembly (fixed mounting—with 80-watt heater)
KS-15837 L8	Broadband Antenna Feed Assembly (fixed mounting—with 80-watt heater)	KS-15924 L7	Broadband Antenna Feed Assembly (360-degree rotatable mounting—with 80-watt heater)
KS-15837 L9	Broadband Antenna Feed Assembly (360-degree rotatable mounting—with 80-watt heater)	KS-15924 L8	Reflector Heater Assembly, 2250 Watts
KS-15837 L10	Reflector Heater Assembly, 1500 watts	KS-15924 L9	Feed Heater Assembly, 80 Watts
KS-15837 L11	Feed Heater Assembly, 80 watts		

1.05 The KS-15837 reflector and antenna feed assemblies weigh approximately 160 pounds without the heaters and 175 pounds with the heaters. Weight of the mounting frame is approximately 275 pounds. The complete antenna weighs approximately 450 pounds with heaters.

1.06 The KS-15838 Antenna is rated "Manufacture Discontinued" and list numbers are therefore not shown.

1.07 The KS-15924 Antenna is covered by the following specification and list numbers. The lists covering separate heaters are included to provide an ordering code when these items are needed for maintenance and repair.

KS-15924 L1 Reflector Assembly (without feed and heater)

1.08 The KS-15924 reflector and antenna feed assembly weighs approximately 250 pounds without the heaters and 265 pounds with the heaters. Weight of the mounting frame is approximately 375 pounds. The complete antenna weighs approximately 640 pounds with heaters.

1.09 The antenna feed assemblies may be manufactured by the Gabriel Electronics Division of the Maremont Corporation or Technical Appliance Corporation. The assemblies are electrically and mechanically interchangeable except for the guying assemblies, and either feed may be supplied under an applicable list number.

1.10 The feed heater assembly is of two different types to apply to feed assemblies which are manufactured either by Gabriel Electronics or Technical Appliance Corporation. When ordering a feed heater assembly as a replacement, the manufacturer of the existing feed assembly should be specified.

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2. TOOLS AND EQUIPMENT

2.01 The following tools may be required for the assembly, installation, and orientation of a parabolic antenna:

QUANTITY	DESCRIPTION
1	5/16-inch Open-End Wrench
1	7/16-inch Open-End Wrench
1	1/2-inch Open-End Wrench
1	5/8-inch Open-End Wrench
1	1-inch Open-End Wrench
1	1-1/8 inch Open-End Wrench
1	1-1/2 inch Open-End Wrench
1	Adjustable Open-End Wrench with 3-inch capacity
1	Electrician's Side-Cutter Pliers
1	Diagonal-Cutter Pliers
1	Needle-Nose Pliers
1	Wire Stripper
1	Screwdriver, 5-inch blade, 5/16- by 0.045-inch tip
1	Screwdriver, 8-inch blade, 3/8- by 0.050-inch tip

2.02 In addition to the tools listed in 2.01, the following materials and equipment may be required:

QUANTITY	DESCRIPTION
-	Tools for opening wooden crates and removing metal straps
1	Ohmmeter
1	KS-19094, L1 Anti-Seize Compound, 8-ounce tube
1	Die and Die Stock for 2-inch NPT
1	Die Lubricant for threading pipe
1	Pipe Vise with 2-inch capacity
1	Pint of Red Zinc Chromate Primer
1	Pint of Semigloss Federal Gray Enamel

- 1 2-inch Paint Brush
- Several 4 by 4 timbers, approximately 6 to 8 feet long, for unpacking and assembling antenna on rough terrain (optional, see 3.02)
- Z.R.C. Paint (or equivalent), Sealube Company, 14 Valley Street, Wakefield, Massachusetts

3. UNPACKING AND HANDLING

3.01 The antenna is shipped to the installation site partially assembled, and is crated to prevent damage during transit (Fig. 2). The crate has a gross weight of approximately 1250 pounds.

3.02 The crate should be unloaded in an area where the terrain is relatively smooth and level and as close to the base of the supporting structure as is practicable. If the area is sufficiently flat and smooth, the crate may be placed directly on the ground. Since the crate consists of open construction it should be set upon 4 by 4 timbers or other supports when rocks or other ground projections are present.

3.03 The crate should be opened carefully and the lumber retained in case it is necessary to reship the antenna due to damages in transit.

3.04 The shipment should be thoroughly checked against the packing list and each item inspected for damage. Note particularly any signs of a damaged antenna feed, distorted reflector contour, and bent or stripped elevation or azimuth adjustment screws. Notify local supervision if any items are missing or damaged.

4. ASSEMBLY

REFLECTOR POSITION ON MOUNTING FRAME

4.01 The L3 mounting frame assembly is reversible, ie, it may be used with the vertical member either to the right or to the left of the center of the antenna. Local supervision should review the antenna orientation plan to determine if the reflector is located on the correct side of the mounting frame. Fig. 3 and 4 illustrate the various mounting

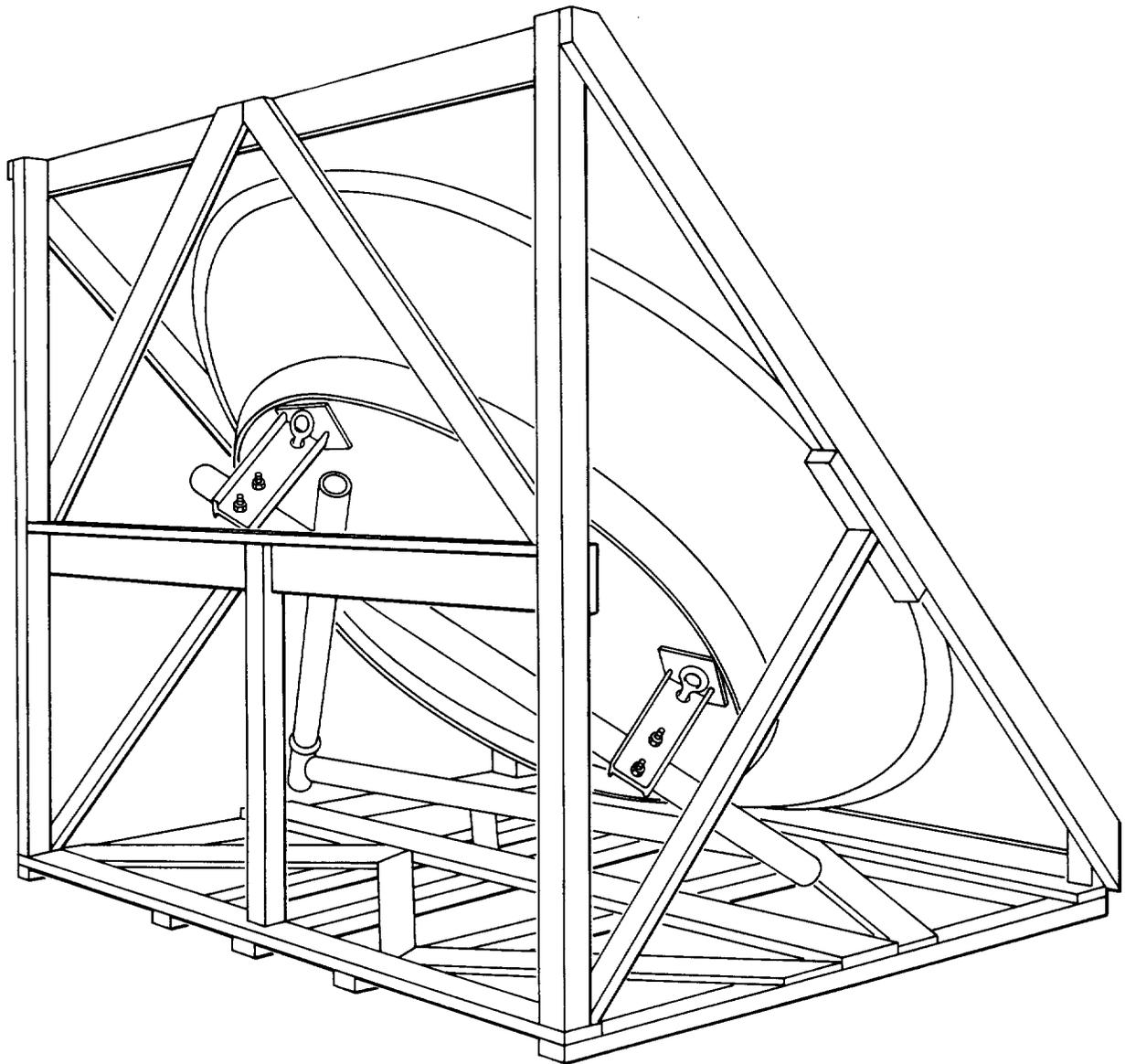
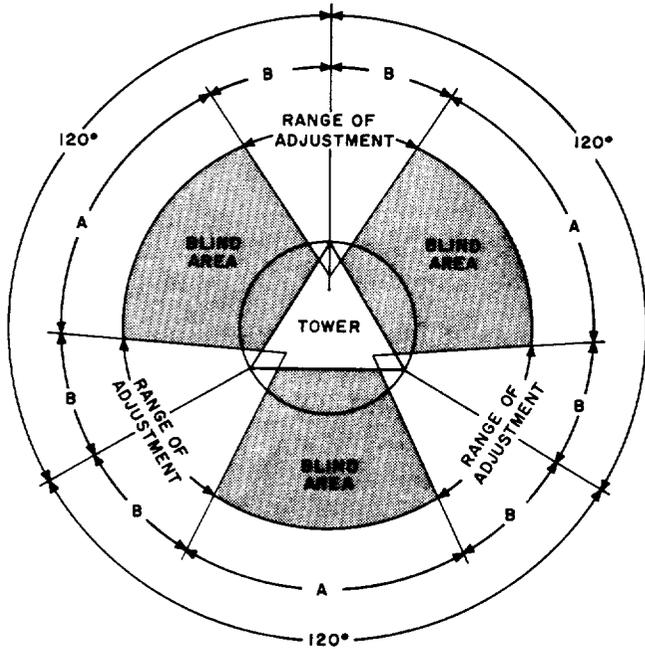


Fig. 2—Antenna in Shipping Crate

arrangements and mechanical azimuth limitations of the antenna when mounted on type B towers. The arrangements and limitations shown for the B Guyed Tower are also applicable to the C Self-Supporting Tower. Refer to Sections AG25.250 on B Self-Supporting Tower, AG25.200 on B Guyed Tower and AG25.450 on C Self-Supporting Tower to determine the number of antennas permitted for each tower.

4.02 If the position of the reflector must be changed, the following procedure should be used: (Fig. 5)

- (a) Remove the 1-14 hex nut and associated hardware from the end of the elevation adjusting screw.
- (b) Loosen the Palnuts and 3/4-10 hex nuts on the two U-bolts which secure the reflector to the mounting frame.
- (c) Carefully pull forward on the lower portion of the reflector and allow it to pivot about the horizontal member of the mounting frame. When the end of the elevation screw clears the frame, swing it upward and carefully lower the reflector until its rim rests on the bottom of the crate.

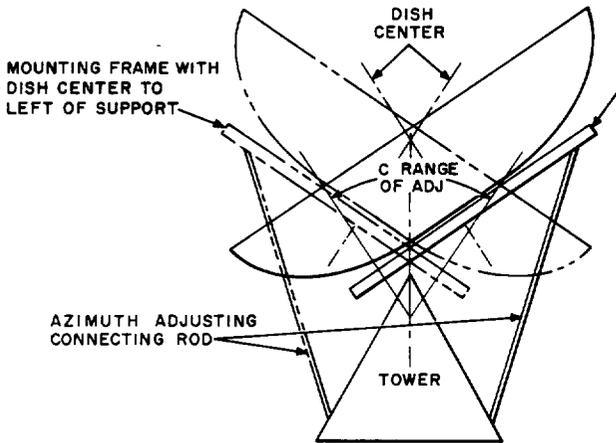


AZIMUTH LIMITATIONS

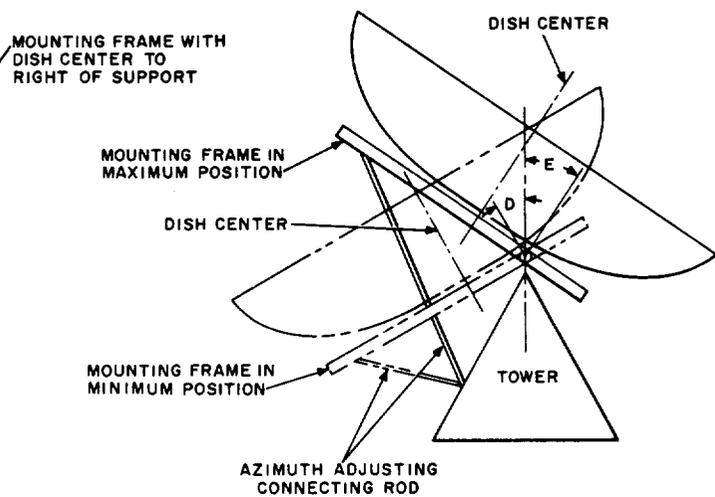
NOTES:

1. ORIENTATION OF ANTENNAS ON THE B GUYED TOWER PER AT-7728.
2. ANGLES SHOWN ARE WITH AZIMUTH ADJUSTING ROD AT MID-POINT AND ALLOW (F) AZIMUTH ADJUSTMENT.
3. WITH ONE, TWO, OR THREE ANTENNAS ON A TOWER A (B) AZIMUTH ADJUSTMENT CAN BE OBTAINED ABOUT 3 BEARINGS 120° APART WHEN ANY FACE OF THE TOWER IS (30°) OFF OF ONE OF THE BEARINGS.
4. WITH THREE ANTENNAS ON A TOWER AND TWO OF THEM OPERATING BACK TO BACK THE THIRD ANTENNA IS LIMITED TO A (G) AZIMUTH ADJUSTMENT ABOUT A BEARING PERPENDICULAR TO THAT OF THE TWO ANTENNAS OPERATING BACK TO BACK.

TABLE A		
	8 FT DIA	10 FT DIA
A	30°	52°
B	45°	34°
C	45°	54°
D	22°	30°
E	45°	34°
F	±6°	±8°
G	±32°	±34°



ARRANGEMENT OF ANTENNA AND MOUNTING FRAME TO OBTAIN MAXIMUM ADJUSTMENT

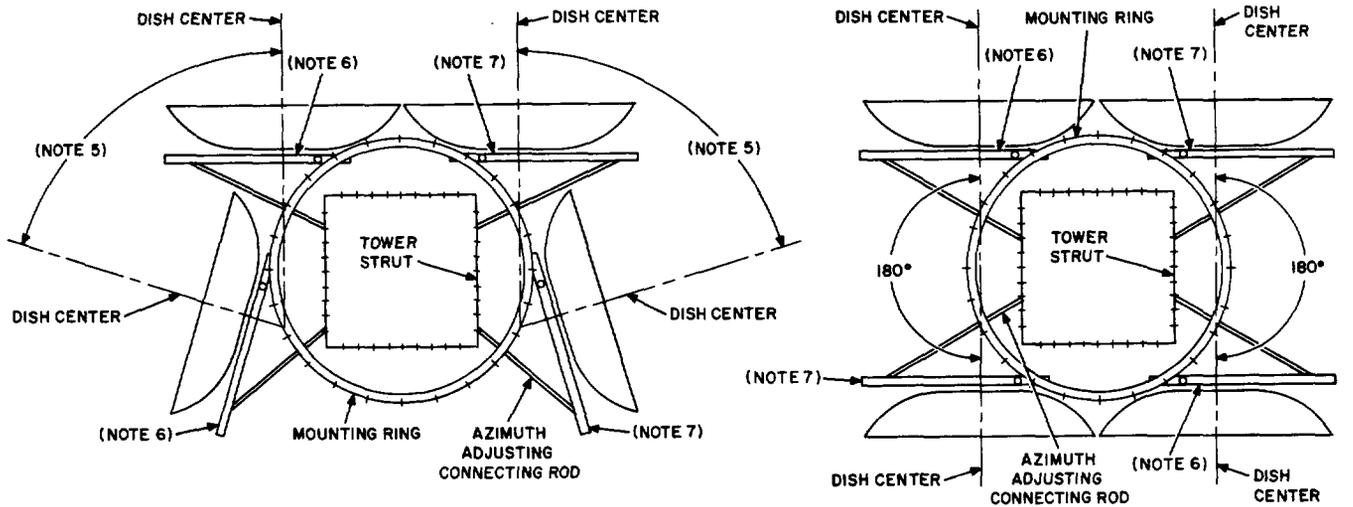


RANGE OF ANTENNA ADJUSTMENT (MOUNTING FRAME SHOWN WITH DISH TO LEFT OF SUPPORT. REVERSE ANGLES WHEN DISH CENTER IS TO RIGHT OF SUPPORT.)

Fig. 3—Antenna Arrangements on B Guyed Tower

NOTES:

1. ANGLES SHOWN ARE WITH AZIMUTH ADJUSTING ROD AT MID-POINT AND ALLOW $\pm 8^\circ$ FOR 8 FT ANTENNA AND $\pm 6^\circ$ FOR 10 FT ANTENNA AZIMUTH ADJUSTMENT.
2. WITH TWO ANTENNAS ON A TOWER THERE IS NO LIMITATION IN AZIMUTH ADJUSTMENT.
3. WITH TWO ANTENNAS ON THE SAME BEARING ON THE SAME SIDE OF A TOWER THE THIRD AND FOURTH ANTENNAS EACH HAVE A MINIMUM AZIMUTH ANGLE OF 72° FOR 8 FT ANTENNA AND 74° FOR 10 FT ANTENNA TO THE ADJACENT ANTENNA. THE FOUR MAY BE OPERATED BACK TO BACK.
4. THE SUPPORT MOUNTING RINGS PERMIT AN ALMOST UNLIMITED ARRANGEMENT OF 1, 2, 3, OR 4 ANTENNAS ON A TOWER. THE SIZE OF THE ANTENNA AND ARRANGEMENT OF DISH ON ITS MOUNT LIMITS THE AZIMUTH ANGLES BETWEEN ANTENNAS. THE AZIMUTH ANGLE BETWEEN A FACE OF THE TOWER AND THE ANTENNA WILL VARY DEPENDING UPON ITS LOCATION ON THE CIRCUMFERENCE OF THE MOUNTING RINGS.
5. 74° MINIMUM FOR 10 FT ANTENNA AND 72° MINIMUM FOR 8 FT ANTENNA.
6. MOUNTING FRAME WITH DISH CENTER TO LEFT OF SUPPORT.
7. MOUNTING FRAME WITH DISH CENTER TO RIGHT OF SUPPORT.



AZIMUTH LIMITATION OF ADJACENT ANTENNA WHEN TWO ANTENNAS ON THE SAME BEARING ARE MOUNTED ON THE SAME SIDE OF TOWER

ARRANGEMENT OF ANTENNAS TO OBTAIN TWO PATHS WITH FOUR ANTENNAS OPERATING BACK TO BACK

8 FT AND 10 FT PARABOLIC ANTENNAS

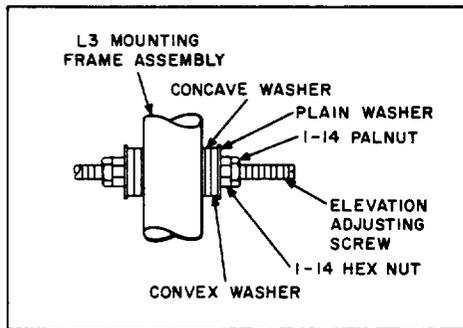
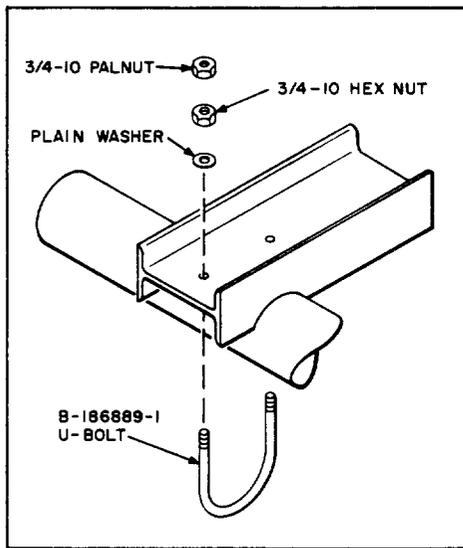
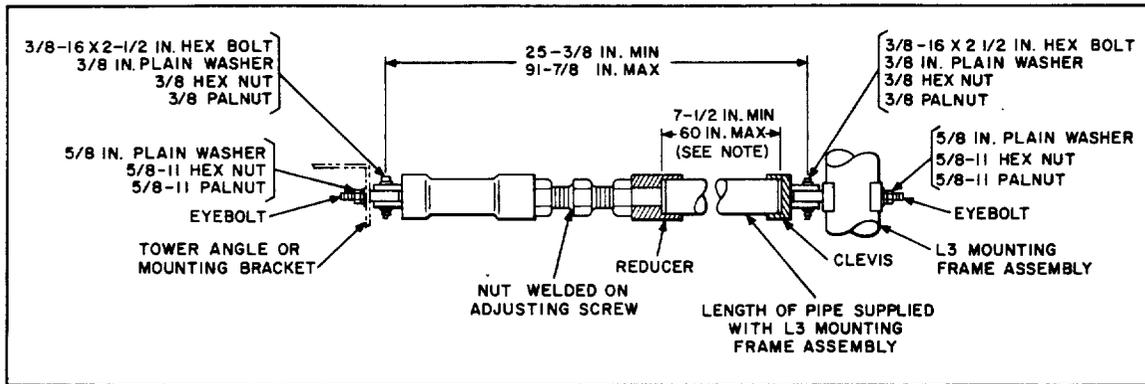
Fig. 4—Antenna Arrangements on B Self-Supporting Tower

- (d) Remove the Palnuts, 3/4-10 hex nuts, washers and U-bolts which secure the horizontal member of the mounting frame assembly to the two supports of the antenna reflector.
- (e) Lift the reflector from the crate and place it face down on the crate cover or other appropriate supporting material.
- (f) Attach a sling to the mounting frame at the junction of the vertical and horizontal members and connect the load line to the sling. Remove all play from the lines and then cut the steel shipping straps which hold the frame in place within the crate. Raise the mounting frame until it clears the crate, rotate it 180

degrees, and then lower it back into the crate. The diagonal member should rest in the wooden saddles at the bottom of the crate.

Note: Secure the mounting frame to the crate to prevent shifting during reassembly of the antenna.

- (g) Reorient the threaded clevis portion of the azimuth adjusting arm on the diagonal member of the mounting frame. Remove the Palnut, 5/8-11 hex nut, and plain washer from the eyebolt. Withdraw the eyebolt from the mounting frame and insert it from the opposite side of the frame and reassemble the hardware. Position the eyebolt so the head of the 3/8-16



NOTE:
FOR MID-RANGE INSTALLATION, THE LENGTH OF THE PIPE SHALL BE THE OVERALL LENGTH OF THE AZIMUTH ARM, MEASURED FROM CENTER TO CENTER OF THE EYEBOLT MOUNTING HOLE AT EACH END, LESS 25 IN.

Fig. 5—Elevation Adjusting Screw and Azimuth Adjusting Arm

hex bolt, which secures the clevis to the eyebolt, faces the horizontal member of the mounting frame.

(h) Lift the reflector and lower it into the crate with the support brackets resting on the horizontal member of the mounting frame. Replace the U-bolts and associated hardware which were removed in Step (d). Do not tighten this hardware until the elevation adjusting screw has been attached to the diagonal member of the mounting frame.

(i) Carefully pull forward on the reflector in the area of the elevation adjusting screw, pivoting the reflector about the horizontal member. Position the end of the elevation adjusting screw over the mounting hole and guide the adjusting screw through the mounting hole. Replace the 1-14 hex nut and the associated hardware which was removed in Step (a).

ANTENNA FEED ASSEMBLY

4.03 The antennas may be used with four types of antenna feeds as follows:

Broadband Antenna Feed Assembly (fixed mounting—without heater)

Broadband Antenna Feed Assembly (360-degree rotatable mounting—without heater)

Broadband Antenna Feed Assembly (fixed mounting and 80-watt heater)

Broadband Antenna Feed Assembly (360-degree rotatable mounting and 80-watt heater)

4.04 The feed assemblies are supplied by more than one manufacturer and there are minor differences in appearance. A Gabriel Electronics feed is shown in Fig. 6 and a Technical Appliance Corporation feed is shown in Fig. 7. The feeds are mechanically and electrically interchangeable with the following exceptions: The guy assemblies and feed heaters from one manufacturer cannot be used with another manufacturer's feed assemblies.

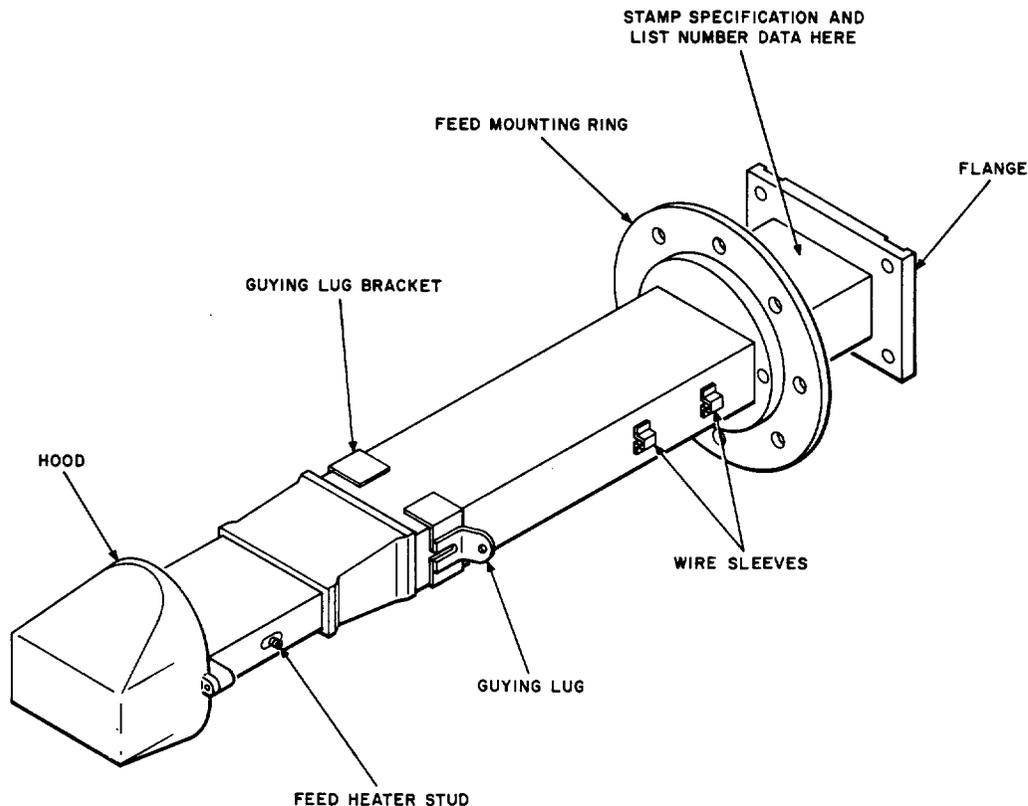


Fig. 6—Broadband Antenna Feed Assembly (Gabriel Electronics)

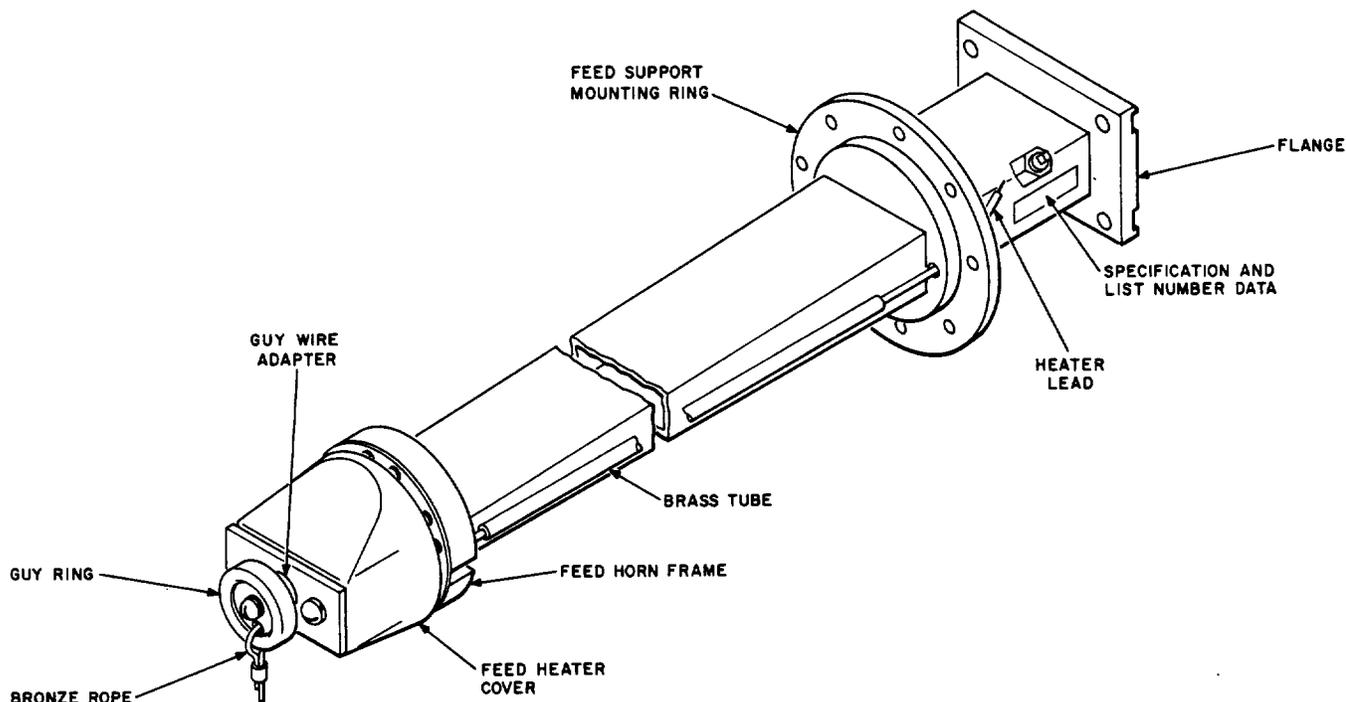


Fig. 7—Broadband Antenna Feed Assembly (Technical Appliance Corporation)

4.05 To facilitate installation of the antenna feed and to allow greater access to the rear of the reflector, the two lower diagonal members on the back of the antenna crate may be removed (Fig. 2).

Note: Do not remove the vertical member on the back of the crate.

4.06 Remove the antenna feed from the packing crate. Insert the antenna feed, hood first, through the mounting hole in the rear of the antenna reflector (Fig. 8). The specification and list number which is stamped on the feed waveguide, between the mounting ring and the waveguide flange, should face the left side of the reflector when the reflector is viewed from the rear.

Caution: Use extreme care when handling the antenna feed assembly. Slight dents in the feed, waveguide, or hood reflector can affect the transmission characteristics of the antenna.

4.07 Support the antenna feed from both ends during installation to prevent misalignment of the feed with the reflector. Align the eight holes in the mounting ring with the eight 1/4-20 threaded studs projecting from the rear of the antenna (Fig. 8). Slide the flange into the eight studs being careful not to damage the threads. Secure the flange to the reflector using a lockwasher and 1/4-20 hex nut on each stud.

Note: Do not remove the protective cover on the connecting flange of the feed assembly until the waveguide runs are installed.

4.08 Place the rectangular gasket, supplied with the antenna feed, in a cloth bag and tie it to the feed assembly where it will be readily available for installation of the waveguide runs.

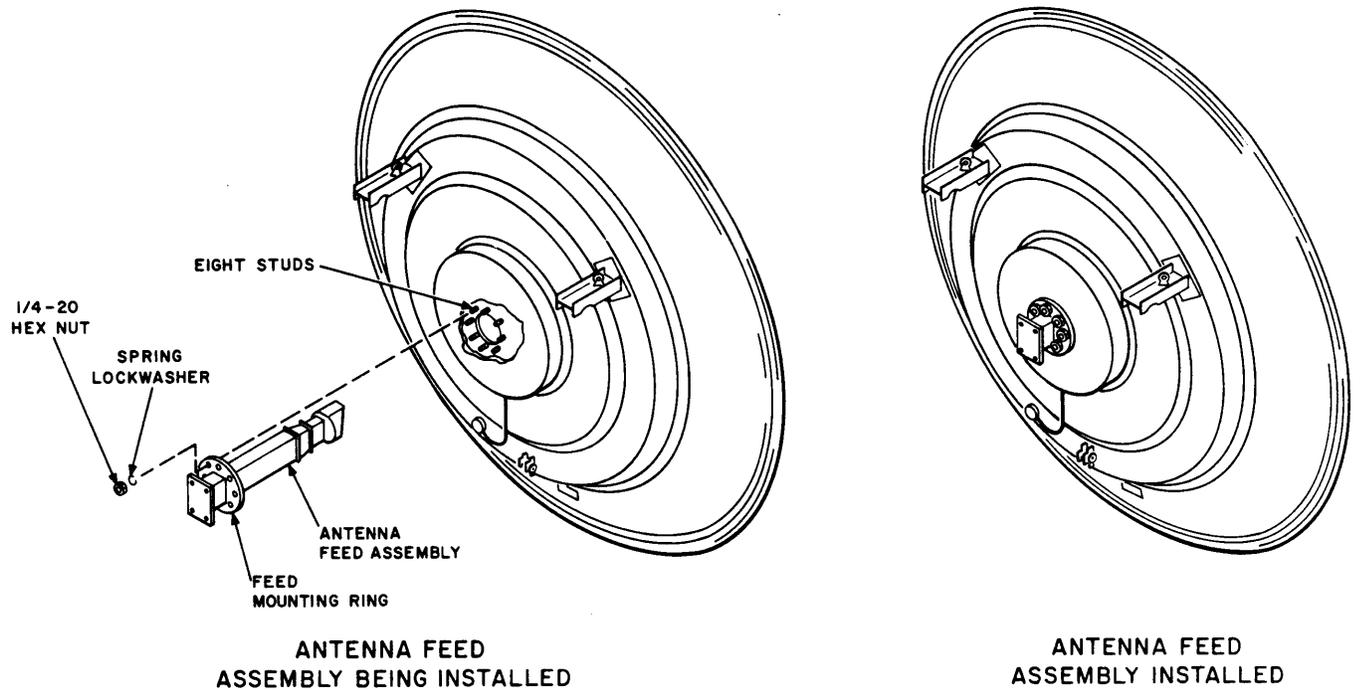


Fig. 8—Installation of Antenna Feed Assembly

FEED GUYING ASSEMBLY

4.09 Three guying assemblies are used to provide additional support for the antenna feed. The guying assemblies (Fig. 9) consist of an eyebolt, a length of bronze tiller rope, two clamps, and a compression spring.

4.10 The feed assembly may be supplied by Gabriel Electronics or Technical Appliance Corporation (TACO). The guying assemblies used on the two feed assemblies, while similar in appearance, are different in length. The guy assembly attaches to the end of the Taco feed and approximately to the center of the Gabriel feed as shown in Fig. 6 and 7.

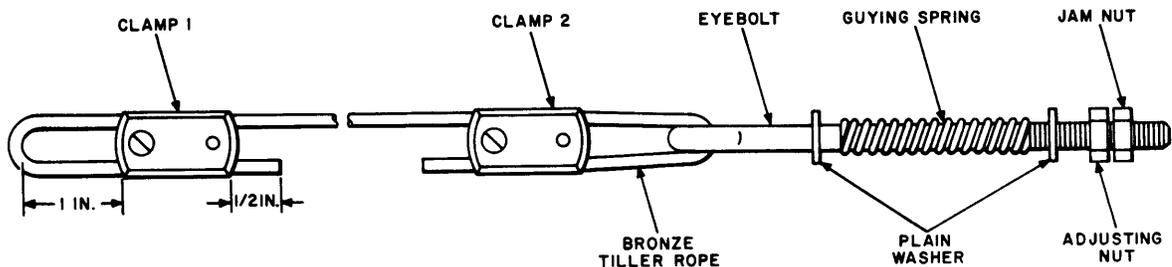


Fig. 9—Antenna Feed Guying Assembly

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4.11 Fig. 10 illustrates the mounting hole configurations in the reflector rim for attachment of the guying assembly eyebolts. The guying assemblies are spaced 120 degrees apart at the outer edge of the reflector rim. There are two sets of mounting holes in the rim. The set of holes designated A is used for a normal installation. When this set is used, the upper guying assembly attaches to the mounting hole in the uppermost portion of the reflector rim, based upon the antenna's normal mounting position.

4.12 The second set of mounting holes designated B is used for special applications, ie, when an antenna feed assembly, with a 360-degree rotatable mounting, is rotated away from a normal installation position for electrical orientation. In this case, the guying lugs on the antenna feed assume a position that requires the guying assemblies to be mounted in the second set of holes.

4.13 The guying assemblies associated with the Gabriel feed are installed as follows:

- (a) Loosen the two screws in clamp 1 on the free end of the tiller rope (Fig. 9).
- (b) Pull the end of the loop in the tiller rope from the clamp and pass it through the guying lug on the antenna feed (Fig. 6).

- (c) Loop the tiller rope and push the free end into the clamp. Make a 1-inch loop and allow a 1/2-inch length to extend beyond the edge of the clamp as shown in Fig. 9. Tighten the two screws to secure the tiller rope.

- (d) Remove the nuts, washers, and springs from the eyebolt.

- (e) Place the eyebolt through the mounting hole in the reflector rim from the front of the reflector.

- (f) Place a washer, spring, washer, and nut on the threaded end of the eyebolt and tighten the nut until the guying spring starts to compress between the two washers. Replace the jam nut and hand-tighten it against the adjusting nut.

Caution: Do not compress guying spring more than 1/4 inch beyond 2-inch free length, since this would introduce an unbalanced tension on the feed assembly.

- (g) If the guying assembly spring cannot be compressed, due to slack in the tiller rope, loosen the jam and adjusting nuts. Then loosen the two screws in clamp 2 which secures the tiller rope to the eyebolt (Fig. 9). Pull the tiller rope through the eyebolt until the rope is taut. Tighten the two screws to secure the tiller rope and repeat step (f).

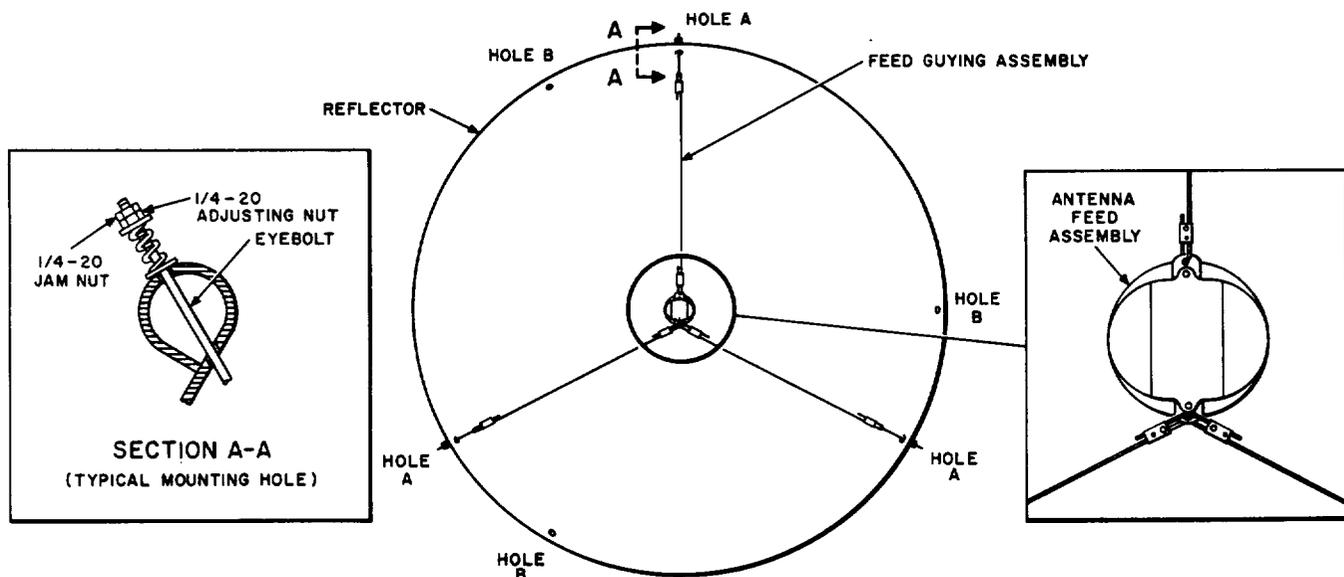


Fig. 10—Mounting Hole Configuration in Reflector Rim

- (h) Repeat steps (a) through (g) for installing the remaining guying assemblies.
- (i) When all three guying assemblies are installed, loosen the jam nut on each eyebolt and tighten the adjusting nuts until each guying spring has the same compressed length and each tiller rope has approximately equal tension. Work around the reflector rim, gradually tightening each adjusting nut, until the proper tension is achieved on all three guying assemblies.
- (j) Securely tighten the jam nuts against the adjusting nuts. Check that the screws on the two clamps of each guying assembly are securely tightened.

4.14 The guying assemblies associated with the Taco feed are installed as follows:

- (a) Remove the screw, lockwasher, and plain washer from the end of the feed assembly.
- (b) Center the guy ring on the guy adapter and replace the hardware removed in (a).
- (c) Follow steps (d) through (j) of 4.13.

FEED HEATER ASSEMBLY AND WIRING

4.15 The feed heater associated with the Gabriel feed (Fig. 11) is different from that associated with the Taco feed (Fig. 12). To install the heater on the Gabriel feed, proceed as follows:

- (a) Remove the two 4-40 hex nuts from the threaded studs on the antenna feed.

- (b) Thread the wires through the slots on the guying lug brackets until the heater is positioned over the hood on the antenna feed (see Fig. 6). Engage the mounting holes in the heater ears with the threaded studs on the feed.
- (c) Secure the ears with the two 4-40 hex nuts.
- (d) Feed the heater leads through the two pairs of wire sleeves on the top and bottom of the antenna feed. Only one lead should run through each pair of sleeves.
- (e) Feed each heater lead through a hole in the feed mounting ring.

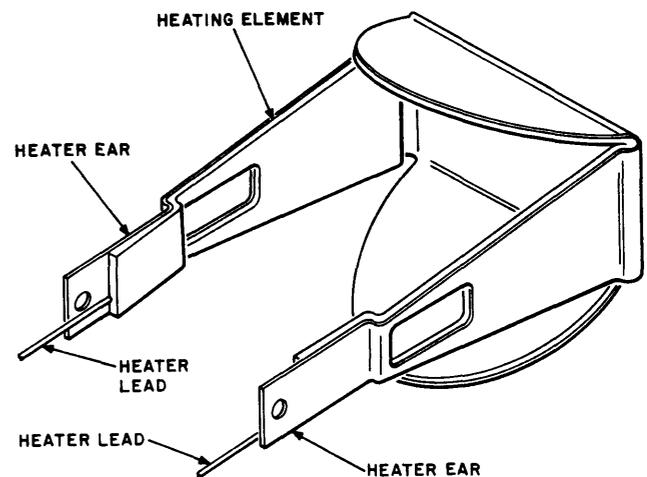


Fig. 11—Feed Heater Assembly (Gabriel Electronics)

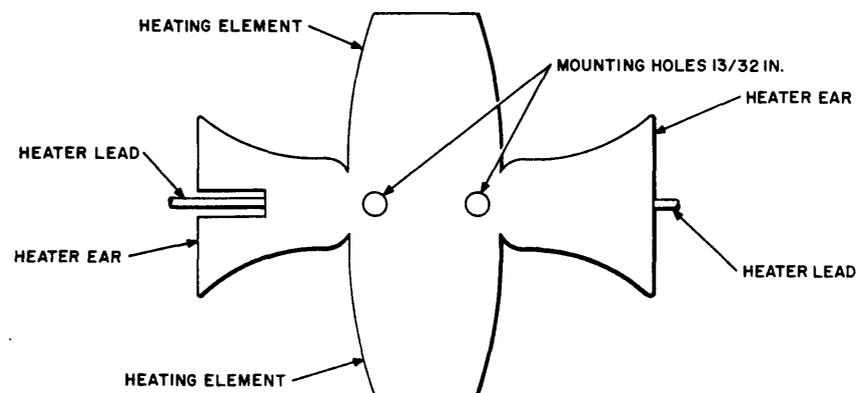


Fig. 12—Feed Heater Element (Technical Appliance Corporation)

(f) Guide the leads over the reflector heater cover, down the reflector rear (in line with the leads to the reflector heater), and insert

the leads into the support clamps. Then extend the leads into the Condulet, and connect to the proper terminals. (Fig. 13.)

NOTES

1. * DENOTES SPLICE.
2. PT LEADS FURNISHED WITH COMPONENTS.
3. DISH HEATER SHALL BE WIRED FOR 230V UNLESS OTHERWISE SPECIFIED.
4. FEED HEATERS SHALL BE WIRED FOR AND OPERATE ON 115V NOMINAL IN ALL CASES.

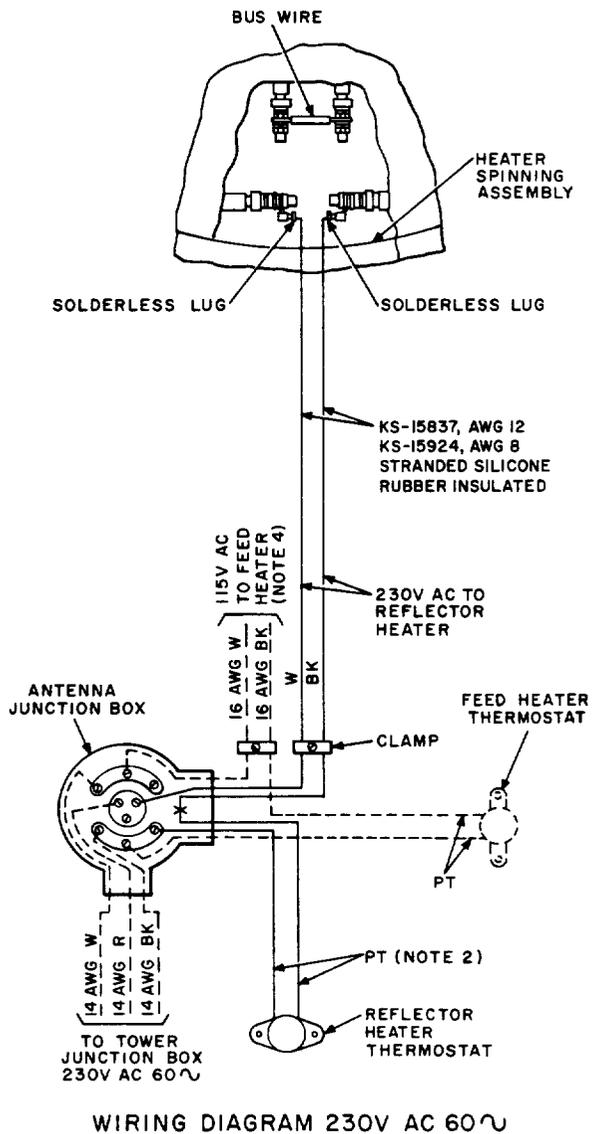
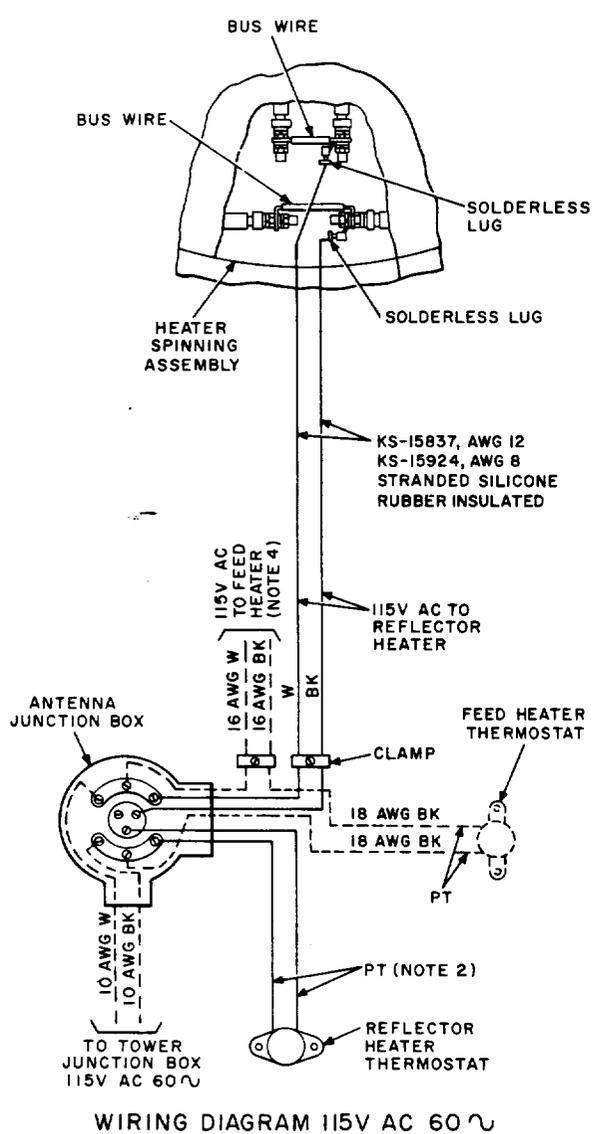


Fig. 13—Feed Heater and Reflector Heater Wiring Diagrams

4.16 After the heater-lead runs have been made, the electrical circuits of both the reflector and antenna feed heaters shall be checked for continuity with an ohmmeter. Table A lists the leads and color coding for the continuity checks. The thermostat, located adjacent to the Condulet, shall be by-passed for the continuity checks.

TABLE A — DATA FOR CONTINUITY CHECKS OF REFLECTOR AND ANTENNA FEED HEATERS

COMPONENT	LEAD COLOR CODE	RESISTANCE (NOMINAL)
Feed Heater	Blue	165 ohms
Reflector Heater (115v ac)	White	6 to 9 ohms
Reflector Heater (230v ac)	White	24 to 36 ohms

4.17 To install a heater on the Taco feed, proceed as follows:

Note: The heater cannot be installed on the feed if the guying assemblies are attached. Remove the guys by reversing the procedures given in 4.14.

(a) Remove the two 10-32 by 1/4 screws, lock washers and flat washers attaching the guy ring adapter to the end of the feed, and the guy adapter from the feed.

(b) Thread the heater wires through the feed horn frame (Fig. 7) and down through the brass tubing on the side of the feed. Continue feeding the wires through until the heater element (Fig. 12) is seated on top of the feed horn.

(c) Place the feed heater cover on the top of the feed aligning the holes in the cover, the feed, and the feed horn.

(d) Place the guy wire adapter in place and secure the adapter, heater, and heater cover in place with the hardware removed in 4.14 (a).

(e) Follow the steps outlined in 4.15 (e) and (f), and 4.16.

REFLECTOR HEATER WIRING

4.18 The reflector heater is normally operated on 230 volts ac and will be wired accordingly by the manufacturer unless specifically ordered for operation at 115 volts ac.

4.19 The L2 reflector will be shipped with the reflector heater completely wired to the junction box located on the rear of the reflector including connection of the thermostat. All that is required in the field is to connect the junction box to 230 volts ac as shown in Fig. 13.

AZIMUTH ADJUSTING ARM

4.20 A 5-foot length of 2-inch, extra strong, galvanized pipe is shipped with each antenna. The pipe must be cut to its proper length and threaded in the field to meet the individual site conditions. The length of the pipe is dependent on the orientation of the antenna with respect to the supporting structure. For mid-range installation, the length of the pipe shall be the over-all length of the azimuth arm, measured from center to center of the eyebolt mounting hole at each end, minus 25 inches, as shown in Fig. 5.

4.21 The proper length of pipe must be selected in order for the azimuth adjusting arm to be fastened within the mounting parameters indicated for each installation. The length of the pipe should not be less than 7-1/2 inches to permit full adjustment of the adjusting screw.

4.22 Paint the cut and threaded portions of the 2-inch pipe with Z.R.C. paint or an equivalent zinc-rich paint as a corrosion preventative.

4.23 Coat the threads with KS-19094 anti-seize compound and assemble the entire unit as shown in Fig. 5.

Note: Do not use a pipe wrench, since the jaws may score the galvanized pipe. The pipe should be hand-tightened into the reducer and clevis. The assembly should then be tightened securely by using an adjustable wrench on the reducer flats, and a 1-5/8 open-end wrench on the clevis fork.

- 4.24 Mount the azimuth adjusting arm on the mounting frame as illustrated in Fig. 5.
- 4.25 Place the azimuth adjusting arm against the vertical member of the mounting frame and secure the arm to prevent its swinging during the hoisting and installation of the antenna.

5. INSTALLATION

GENERAL

- 5.01 Provide suitable hoisting tackle and rig the tackle so the 450-pound antenna assembly

or 650-pound antenna assembly can be raised directly to the elevation at which the installation is to be made.

- 5.02 Connect the lifting sling to the two pad eyes supplied with the antenna (Fig. 14). The pad eyes are installed in the mounting support assembly.

- 5.03 When lifting the antenna from the shipping crate care must be exercised to prevent rolling of the antenna on its rim. This could cause distortion of the reflector contour and degradation of the signal.

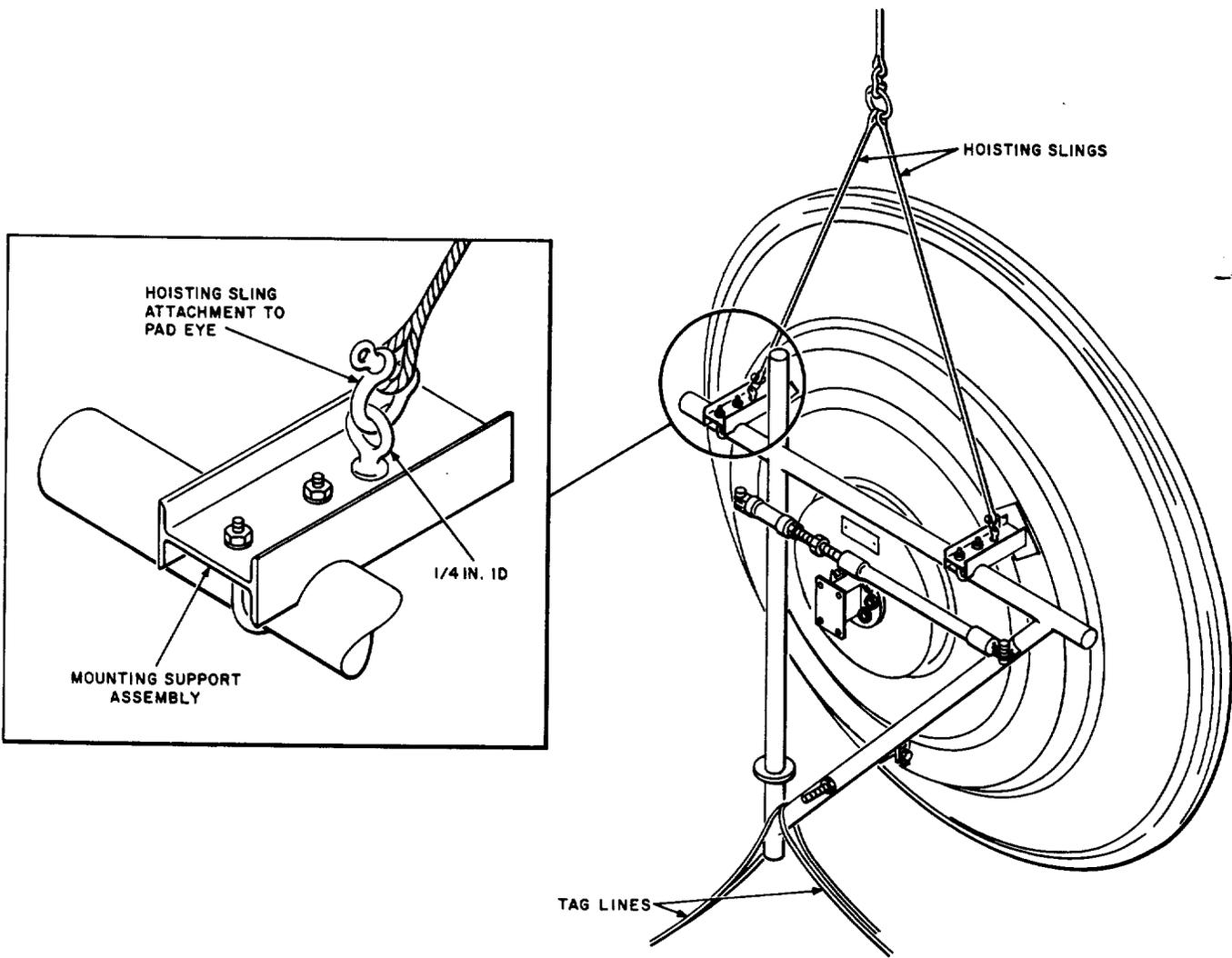


Fig. 14—Hoisting Sling and Tag-Line Attachments to Antenna

5.04 Connect two tag lines to the mounting frame at the junction of the vertical and diagonal member as illustrated in Fig. 14. The tag lines should be used to prevent the antenna from striking the support structure or guy wires during the hoisting operation. As the antenna rises, it may be necessary for the men on the tag lines to move further from the support structure base in order to guide the antenna properly.

PRECAUTIONS

5.05 Installation of the antenna should not be attempted unless wind velocities are moderate and weather conditions are expected to remain stable.

5.06 While work is in progress, there shall be at least one person in attendance on the ground. Anyone who is required to climb the supporting structure, while work is in progress aloft, should arrange to climb at a time when there is the least probability of any object being dropped or falling from the work location aloft.

5.07 All personnel who will be on the structure or working in its vicinity shall wear safety headgear. Body belts and safety straps are to be worn and used whenever the need is indicated.

5.08 Tools, parts, hardware, etc, should either be hauled aloft on a line or carried aloft in a closed bag, pouch, or in suitable slots in a tool belt. Any tools or other objects used aloft shall be lowered to the ground when their use is no longer required. Do not leave tools or other loose objects lying on ledges. Place them in a bag or pouch or otherwise secure them where they will not fall.

5.09 When work is being done on guyed structures, exercise care to avoid striking the guys with objects being raised or lowered.

5.10 The precautions given in 5.05 through 5.09 are basic precautions to be observed. However, they are neither all-inclusive nor do they supersede established safety practices of reliable contractors. Bell System personnel should observe the precautions given here as well as those that may be established locally.

INSTALLATION ON AT-7728 B GUYED TOWER

5.11 All installation procedures are shown on Fig. 15. Determine the location of the P-15G462 brackets. The brackets have an upper or lower position. Use the upper position when the vertical member of the mounting frame is to the left of the reflector center as viewed from the rear of the antenna. Use the lower position when the vertical member is to the right of the reflector center as viewed from the rear.

5.12 Attach the four P-15G462 brackets to the tower leg using three 1/2-13 x 1 3/4 hex head bolts, 1/2 plain washers, 1/2-13 hex nuts, and 1/2-13 Palnuts for each bracket.

5.13 Hoist the antenna to the proper level and guide it into position against the mounting brackets. Place a P-15G470 saddle between the vertical member of the mounting frame and the P-15G462 brackets at the two attachment points. The collar on the mounting frame should rest on top of the lower mounting saddle. Attach the saddles and the mounting frame to the brackets using the four B-186889-2 U-bolts 5/8-11 hex nuts, and 5/8-11 Palnuts supplied with the mounting frame. Draw the U-bolts up snugly, but do not tighten them securely until the azimuth adjusting arm is installed and the antenna is mechanically oriented.

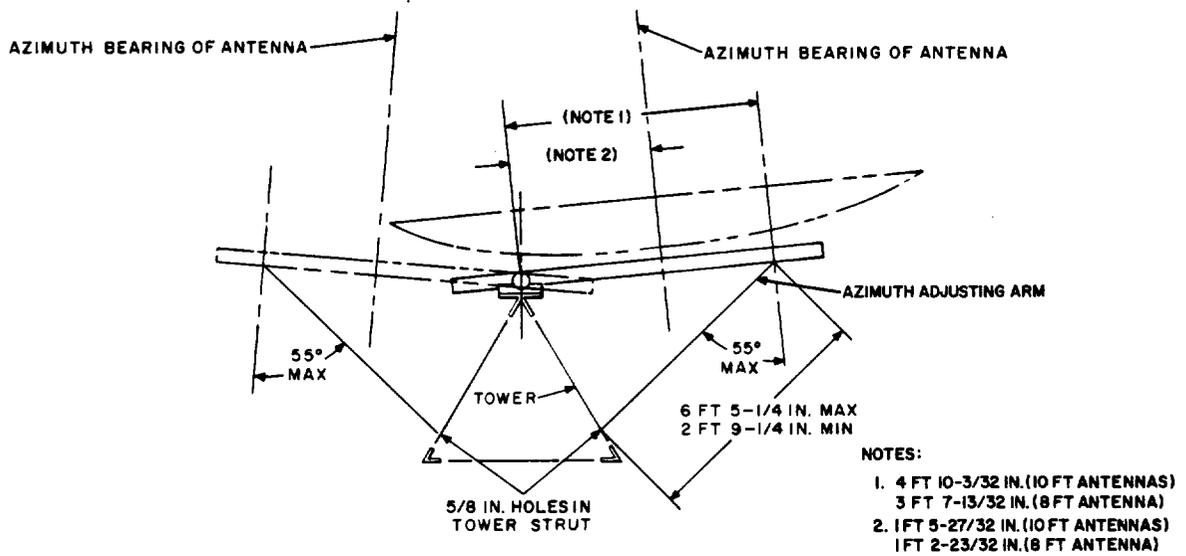
5.14 With the antenna still supported by the winch line, attach the azimuth adjusting arm to the tower strut. Secure with a 5/8 plain washer, 5/8-11 hex nut, and 5/8-11 Palnut.

5.15 Mechanically orient the antenna to the azimuth and elevation specified on the plot plan. (See Part 6.)

5.16 Check that all supporting hardware is properly secured and remove the sling and tag lines from the mounting frame.

INSTALLATION ON AT-7729 B SELF-SUPPORTING TOWER

5.17 All installation procedures are shown on Fig. 16. Hoist the antenna to the installation level and guide it into position against the center and bottom mounting rings of the tower.



AZIMUTH LIMITATIONS

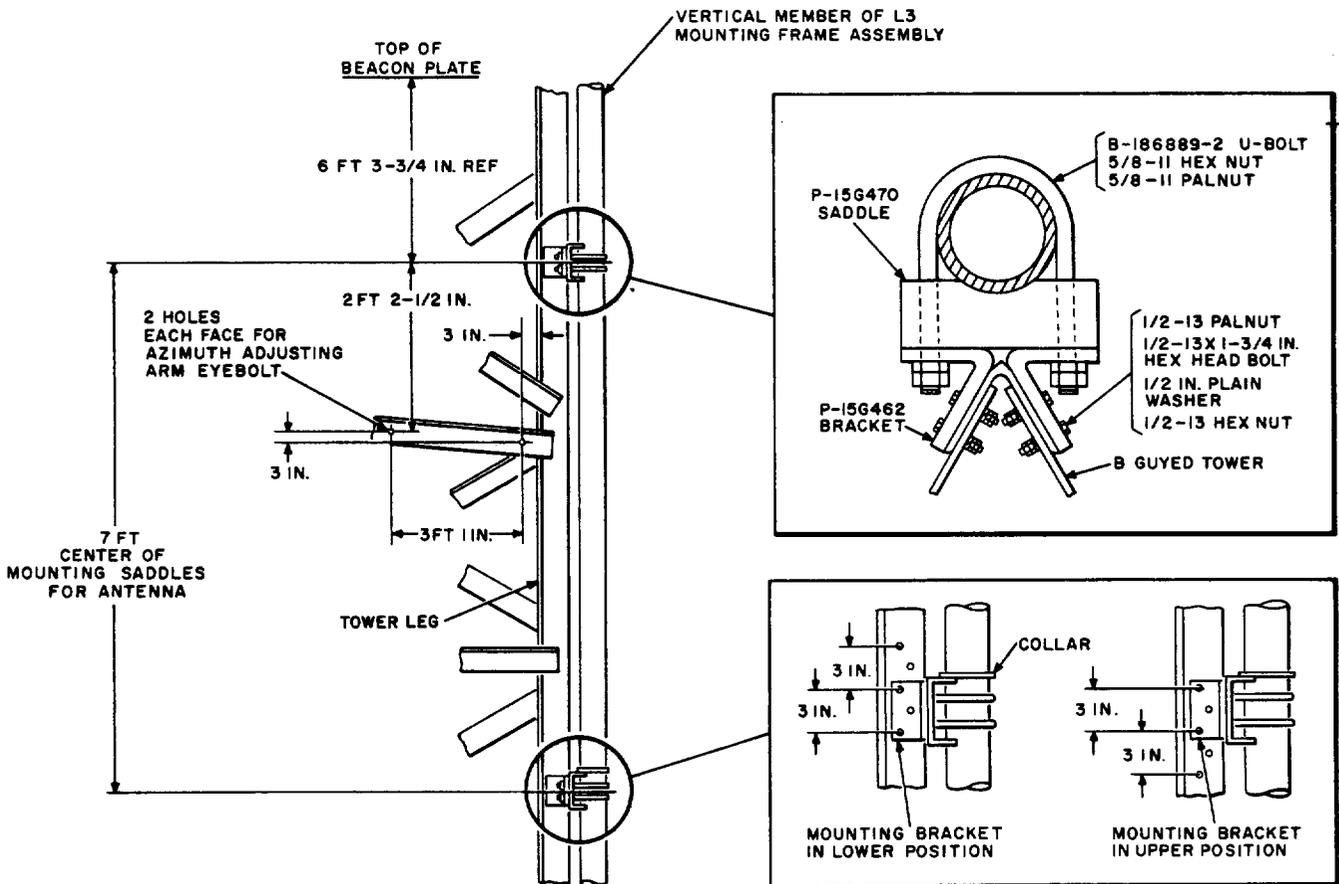
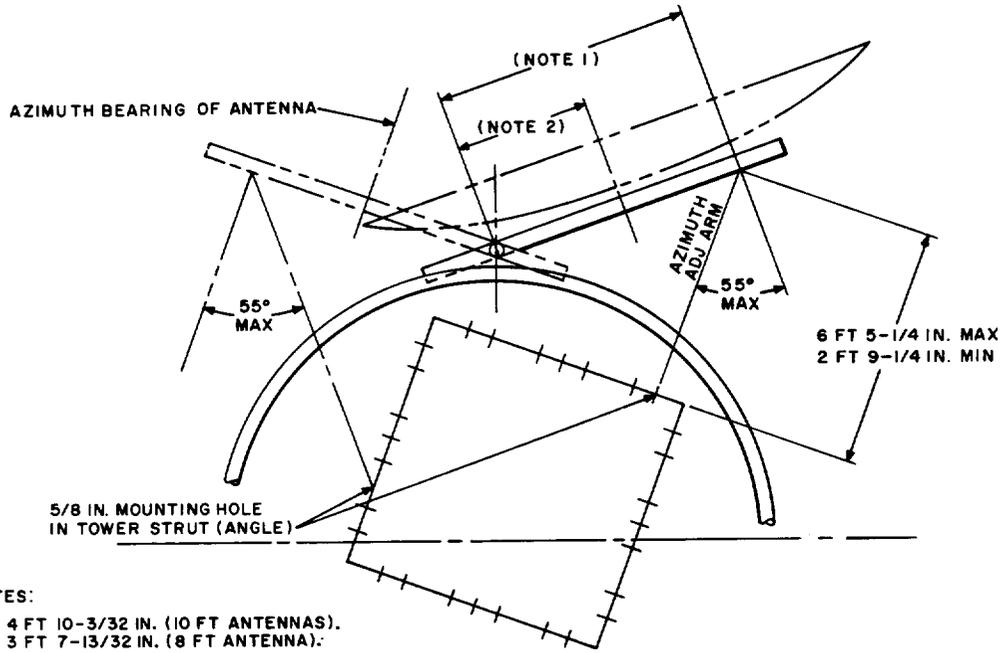


Fig. 15—Antenna Installation on AT-7728 B Guyed Tower



NOTES:

1. 4 FT 10-3/32 IN. (10 FT ANTENNAS).
3 FT 7-13/32 IN. (8 FT ANTENNA).
2. 1 FT 5-27/32 IN. (10 FT ANTENNAS).
1 FT 2-23/32 IN. (8 FT ANTENNA).

AZIMUTH LIMITATIONS

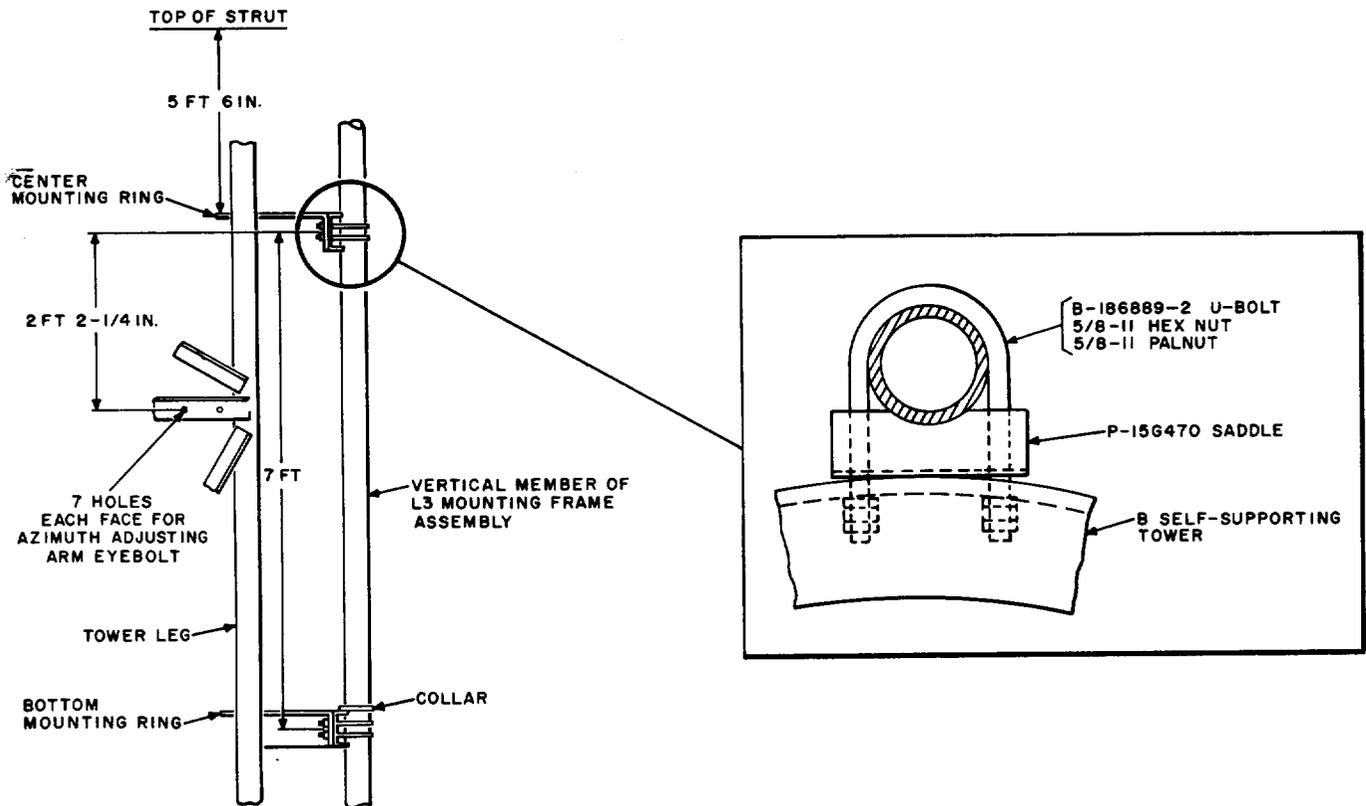


Fig. 16—Antenna Installation on AT-7729 B Self-Supporting Tower

5.18 Place the two P-15G470 saddles between the vertical member of the mounting frame and the center and bottom mounting rings of the tower. The collar on the vertical member should rest on top of the lower mounting saddle. Attach the saddles and the antenna mounting frame to the mounting rings by using the two B-186889-2 U-bolts, 5/8-11 hex nuts, and 5/8-11 Palnuts supplied with the antenna mounting frame. Draw the U-bolts up snugly, but do not tighten them securely until the azimuth adjusting arm is attached to the tower strut and the antenna is mechanically oriented.

5.19 With the antenna still supported by the winch line, attach the azimuth adjusting arm to the tower strut. Local supervision shall determine, from mounting information and the antenna orientation plan, the correct mounting hole for the azimuth adjusting arm eyebolt. Insert the eyebolt and secure with a 5/8 plain washer, 5/8-11 hex nut, and 5/8-11 Palnut.

5.20 Mechanically orient the antenna to the azimuth and elevation specified on the plot plan. (See Part 6.)

5.21 Check that all supporting hardware is properly secured and remove the sling and tag lines from the mounting frame.

INSTALLATION ON AT-8013 C SELF-SUPPORTING TOWER

5.22 All installation procedures are shown on Fig. 17. Determine the location of the P-440499 brackets. The brackets have an upper or lower position. Use the upper position when the vertical member of the mounting frame is to the left of the reflector center as viewed from the rear of the antenna. Use the lower position when the vertical member is to the right of the reflector center as viewed from the rear.

5.23 Attach the four P-44Q499 brackets to the tower leg using three 5/8-11 x 1 3/4 hex head bolts, 5/8 plain washers, 5/8-11 hex nuts, and 5/8-11 Palnuts for each bracket.

5.24 Hoist the antenna to the proper level and guide it into position against the mounting brackets. Place a P-44Q494 yoke between the vertical member of the mounting frame and the P-44Q499 brackets at the two attachment points. The collar on the mounting frame should rest on top of the lower mounting yoke. Attach the yokes

and the mounting frame to the brackets using the four B-44Q498 U-bolts, 5/8 plain washers, 5/8-11 hex nuts, and 5/8-11 Palnuts. The B-186889-2 U-bolts supplied with the mounting frame should be discarded. Draw the U-bolts up snugly, but do not tighten them securely until the azimuth adjusting arm is installed and the antenna is mechanically oriented.

5.25 With the antenna still supported by the winch line, attach the azimuth adjusting arm to the tower strut. Secure with a 5/8 plain washer, 5/8-11 hex nut, and 5/8-11 Palnut.

5.26 Mechanically orient the antenna to the azimuth and elevation specified on the plot plan. (See Part 6.)

5.27 Check that all supporting hardware is properly secured and remove the sling and tag lines from the mounting frame.

INSTALLATION ON ROOF

5.28 Roof mounting of the antennas has not been standardized and detailed information will not be given in this section. Reference should be made to the typical installations described in the preceding paragraphs for general mounting information. This data may be revised and adapted by local supervision to meet the requirement of a given site. See Fig. 18 for general installation procedures.

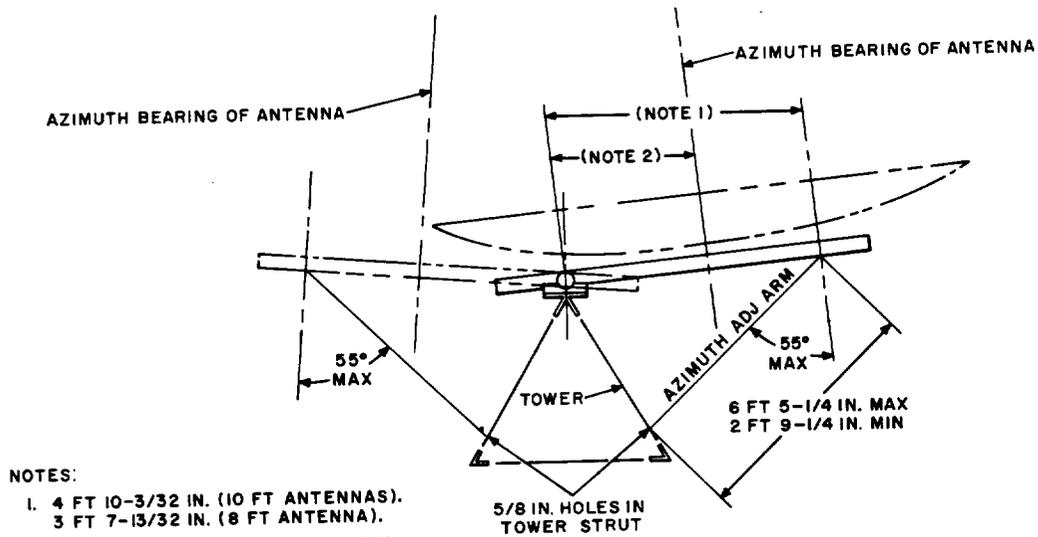
6. ORIENTATION

GENERAL

6.01 The orientation procedures which follow do not cover electrical orientation of the antenna, but discuss only the mechanical orientation of the antenna in elevation and azimuth.

ELEVATION ADJUSTMENT

6.02 Orientation of the antenna in elevation is accomplished by repositioning the elevation adjusting screw in the diagonal member of the mounting frame. The screw (Fig. 5) is attached to a pillow block on the lower rear of the antenna reflector. The free end passes through the diagonal member and is locked in the desired position with two hex nuts.



NOTES:

1. 4 FT 10-3/32 IN. (10 FT ANTENNAS).
3 FT 7-13/32 IN. (8 FT ANTENNA).
2. 1 FT 5-27/32 IN. (10 FT ANTENNAS).
1 FT 2-23/32 IN. (8 FT ANTENNA).

AZIMUTH LIMITATIONS

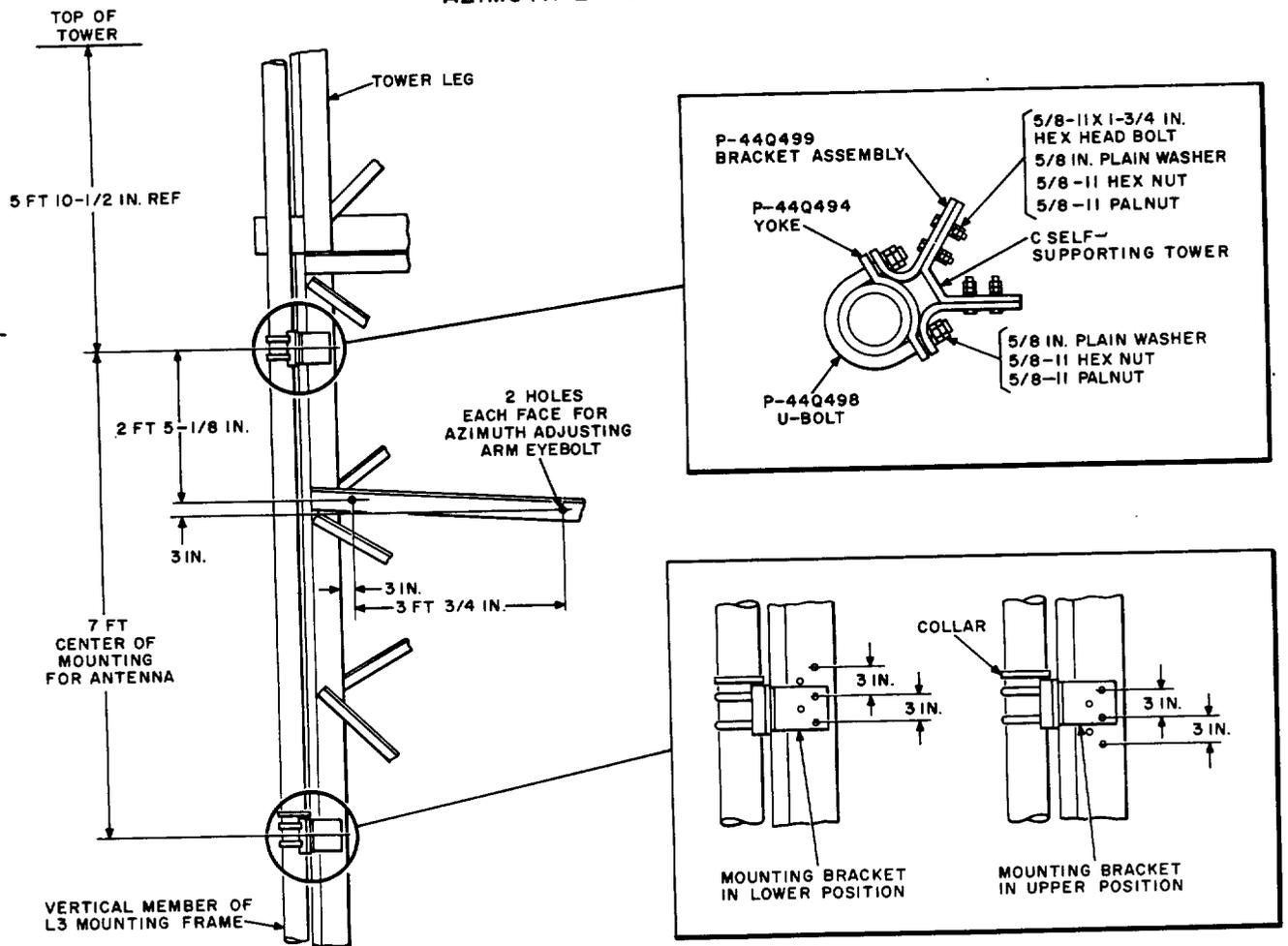


Fig. 17—Antenna Installation on AT-8013 C Self-Supporting Tower

6.03 The antenna feed and reflector will move approximately 0.07 degree in elevation for each revolution of the hex nuts. This is equivalent to 1.0 degree per inch of travel by the hex nuts on the adjusting screw. The maximum elevation adjustment is ± 4.0 degrees from normal, normal being the reference point when the antenna feed is perpendicular to the mounting frame.

AZIMUTH ADJUSTMENT

6.04 Orientation of the antenna in azimuth, is accomplished by changing the length of the

azimuth adjusting arm. The arm (Fig. 14) is between the diagonal member on the mounting frame and a tower angle or mounting bracket.

6.05 The antenna feed and reflector will move approximately one-half of a degree in azimuth for each revolution of the azimuth adjusting screw which is an integral part of the adjusting screw. An azimuth adjustment of ± 6.0 degrees from normal is possible, normal being the mean position of the azimuth adjusting arm.

TYPICAL MOUNTING OF ANTENNA ON FRAMEWORK

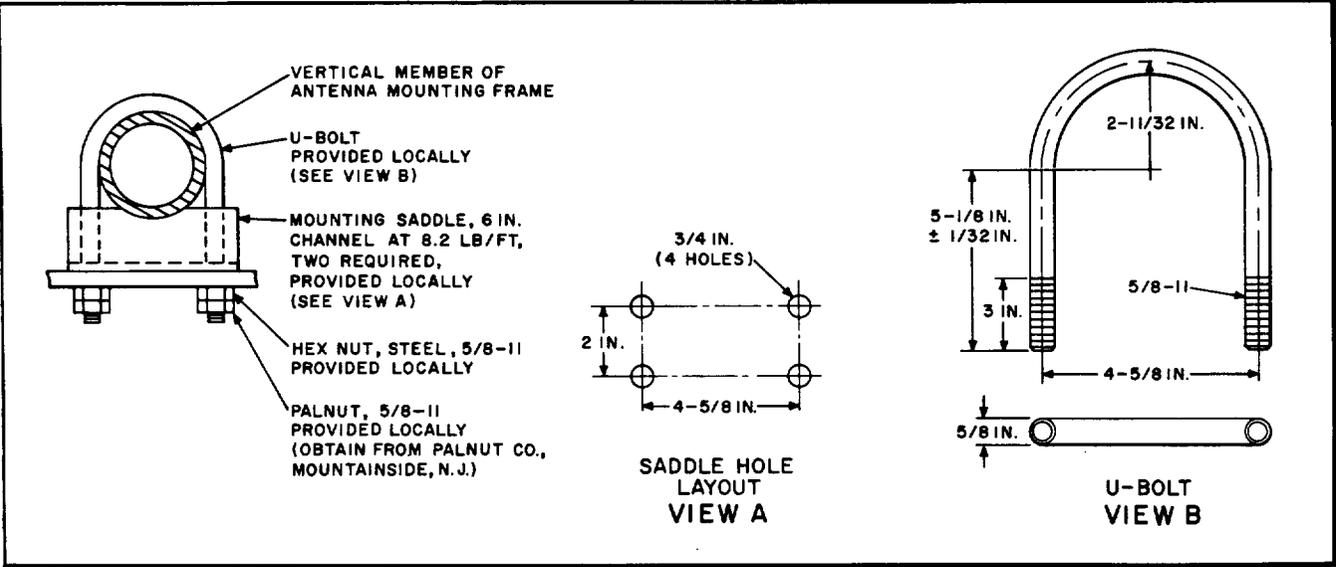
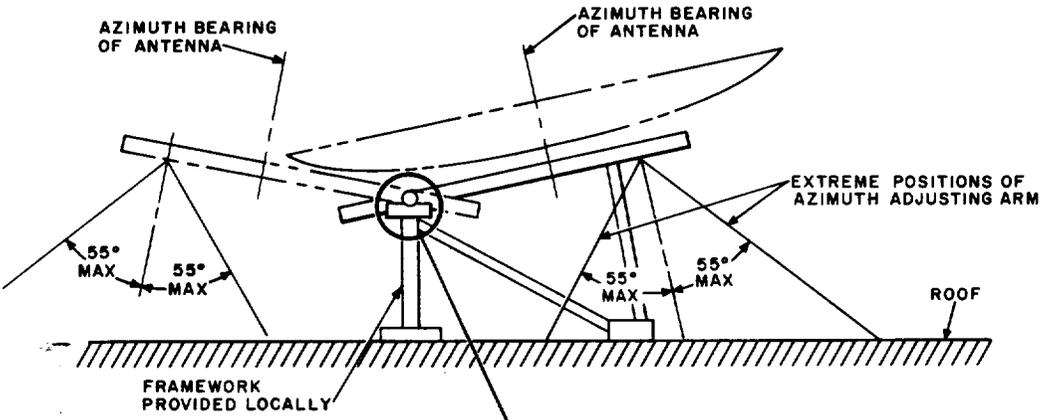


Fig. 18—Antenna Installation on Roof